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RECONNAISSANCE REPORT FOR CROOKED CREEK MARLBORO COUNTY
SOUTH CAROLINA(U) CORPS OF ENGINEERS CHARLESTON SC
CHARLESTON DISTRICT AUG 83

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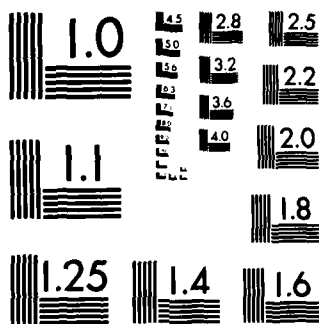
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AD-A153 075

**RECONNAISSANCE REPORT
FOR**

CROOKED CREEK

MARLBORO COUNTY, S.C.



**US Army Corps
of Engineers**
Charleston District

Property of the
U.S. Government

Return To:
U.S. Army Corps of Engineers
Attn: SAC ASM
P.O. Box 919
Charleston, SC 29402-0919

**SECTION 205
OF THE
1948 FLOOD CONTROL ACT
AS AMENDED**

AUGUST 1983

**DTIC
SELECTED
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A**

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Crooked Creek Marlboro County, South Carolina		5. TYPE OF REPORT & PERIOD COVERED Reconnaissance
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U. S. Army Corps of Engineers Charleston District P. O. Box 919, Charleston, S. C.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U. S. Army Corps of Engineers Office Chief of Engineers Washington, D.C. 20314		12. REPORT DATE August 1983
		13. NUMBER OF PAGES 9
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) U. S. Army Corps of Engineers South Atlantic Division 30 Pryor Street, S. W. Atlanta, Georgia 30303		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release: Distribution Unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Prepared in cooperation with the Marlboro County Council, S. C. and the U. S. Fish and Wildlife Service.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Flood Control Environmental Impact		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Reconnaissance report determines the advisability initiate detail studies. The report recommends approval of further study.		

BENNETTSVILLE, MARLBORO COUNTY, SOUTH CAROLINA

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Application for
 INS CARD
 (1-10)
 Underlying
 Justification
 By
 District Attorney
 Approved by
 District Attorney
 Date



DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 919
CHARLESTON, S.C. 29402

REPLY TO
ATTENTION OF

SACEN-PS

22 August 1983

SUBJECT: Reconnaissance Report, Crooked Creek, Bennettsville, Marlboro
County, South Carolina

Commander, South Atlantic Division
ATTN: SADPD-P

AUTHORITY

1. This reconnaissance report was prepared under authority contained in Section 205 of the 1948 Flood Control Act, as amended. Subject report was initiated by letter to SADPD-P dated 31 May 1983, subject: Crooked Creek, Bennettsville, Marlboro County, South Carolina. The City of Bennettsville, the local sponsor, requested flood control assistance by letter dated 16 May 1983 (See Inclosure 1).

SCOPE OF WORK

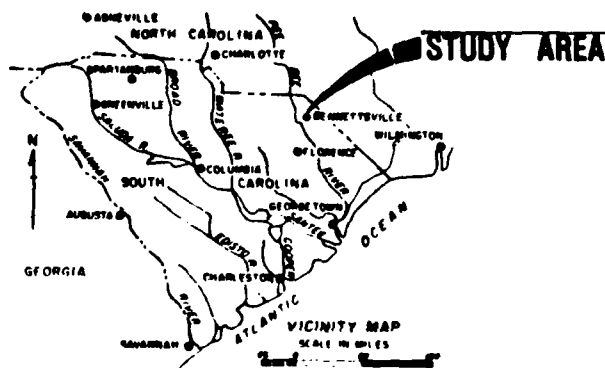
2. This report was prepared using readily available data, supplemented where necessary with additional field surveys and in-house studies. The purpose of this report is to determine the magnitude of existing water resource problems and the feasibility of further Federal involvement in formulating solutions to these problems. Due to the nature of this report, information contained herewith is considered preliminary and subject to revision should detailed investigation be authorized.

PRIOR REPORTS

3. There are no previous Corps reports available for the study area.

STUDY AREA DESCRIPTION

4. Location. Crooked Creek is a tributary to the Great Pee Dee River located in the northeastern portion of South Carolina in Marlboro County. Its confluence with the Great Pee Dee River is just above the U. S. Highway 401 and 15 crossing approximately 9 miles southwest of Bennettsville, South Carolina. Crooked Creek also drains portions of Richmond and Scotland Counties, North Carolina. The entire study reach of Crooked Creek lies within Marlboro County, South Carolina.



5. Topography. The drainage basin lies in the upper coastal plain region of the Carolinas. The area is typical of the Carolina Bay and Sand Hill region. Elevations in the study area range from about 90 feet NGVD below Bennettsville, to approximately 400 feet NGVD in the upper reaches of the basin. Streams in the basin have relatively flat slopes with upland areas marked with Carolina Bays.

6. Climate. There are no streamflow or rainfall gages in the basin. A NOAA rainfall gage is located at McColl, South Carolina, just east of the basin. This station has an average annual temperature is 62.8°F and an average annual rainfall is 46.1 inches.

7. Environmental Consideration. A preliminary assessment of environmental concerns of the study area is attached as Inclosure 2 to this report. A preliminary report from the U. S. Fish and Wildlife Service addressing wildlife habitat value of the area is Inclosure 3.

PROBLEMS UNDER CONSIDERATION

8. Flood Problems. Flooding from Crooked Creek is a major problem in the City of Bennettsville, South Carolina. The degree of flooding reported herein reflects information obtained from local officials and published data obtained from the July 1978 Expanded Flood Hazard Evaluation report, and the Phase I inspection report for Lake Wallace Dam, conducted under the 1978 National Dam Safety Program. A field reconnaissance was made by the Corps' study team and a staff member of the U. S. Fish and Wildlife Service. For the purpose of the report, five foot contour interval mapping was used to obtain approximate limits of flooding and to estimate building elevations.

9. Flooding of the urbanized area extending from Lake Wallace Dam to Rodgers Street Extension is the problem being addressed by this study. There are approximately 275 single family residences, 32 apartment housing units, and about 25 commercial and public buildings within the flood plain. The value of the residential structures ranges from about \$10,000 to \$40,000 each. The value of the commercial and public buildings ranges from about \$20,000 to \$75,000 each. The preliminary estimate of average annual damage to urban

property is \$239,000. These damages are based on the assumption that Lake Wallace Dam would not fail at any level of flow. This probably would not prove accurate in as much as this dam was classified as being unsafe when analyzed under the National Dam Safety Program. It would be expected that a potential exists for greater downstream flood damages than those stated herein, and possibly some loss of life should the dam not be made safe.

10. Other categories of damageable property are affected by flooding. These will be analyzed in the next phase of study and include such things as roads, bridges, emergency costs, public utilities, agricultural property, and existing dams.

11. Hydrologic Analysis. A hydrologic analysis for Crooked Creek was completed in July 1978 for an Expanded Flood Hazard Evaluation for Bennettsville, South Carolina. The hydrologic analysis used for this evaluation was adopted for use in this report and pertinent discharges and return frequencies are listed in Table 1.

TABLE 1
DISCHARGE FREQUENCY DATA
CROOKED CREEK
MARLBORO COUNTY, SC

LOCATION	D. A. SQ MI	Recurrence Interval			
		10-YR (cfs)	50-YR (cfs)	100-YR (cfs)	500-YR (cfs)
At Lake Wallace Dam	56.8	1,618	2,571	2,893	4,533

STUDY OBJECTIVES

12. The objectives of this phase of the investigation are to determine the feasibility of further Federal involvement in addressing the flooding problems and to develop a detailed study plan. Should further study be needed, the objectives would be to formulate alternative measures to alleviate flood damage and to select the best course of action to alleviate these problems.

PLANNING CONSTRAINTS

13. There are no major planning constraints known at this time.

POTENTIAL SOLUTIONS

14. Several alternative measures to meet the problems and needs of the area are possible; however, some of these measures are not practical or economical. Possible solutions may be divided into two broad categories of structural and nonstructural. Structural measures are designed to modify floods by altering the existing environment. These measures include alternatives which reduce flood elevations, divert floods, change the timing and duration of floods or restrict floods from portions of the flood plain. Nonstructural measures are designed to modify flood damage susceptibility and include modifications to the cultural environment by adjustment in the pattern and mode of land use, by developmental policies and by assistance to affected individuals. Also, a combination of structural and nonstructural measures is possible.

NONSTRUCTURAL MEASURES

15. Nonstructural measures do not attempt to reduce or eliminate flooding but are designed to regulate the use and development of the flood plain, thus lessening damaging effects of large floods. Nonstructural measures consist of subdivision regulations, zoning, building codes, flood proofing, evacuation, open-space development and other measures to remove properties from the flood plain.

STRUCTURAL MEASURES

16. Structural measures are designed to alleviate flood problems by reducing flood stages or by moving damageable properties from the flood plain. These measures include channel modification, dams and reservoirs, and levee construction.

17. Hydraulic Analysis. A structural plan consisting of a channel designed to contain the 10-year flood, generally within banks, was formulated to evaluate the desirability of further Federal participation in determining the feasibility of corrective works. Table 2 lists pertinent design data.

TABLE 2
CROOKED CREEK CHANNEL DESIGN

ITEM	REACH
Starting Station	509+00
Ending Station	626+00
Reach Length (Feet)	11,700
Design Discharge (CFS)	1,618
Side Slope	1V to 3H
Bottom Grade	0.0006
Bottom Width (Feet)	50

PROJECT COSTS

18. The total first cost for constructing the above-described plan would be about \$970,000. Cost estimates are based on preliminary data and will be modified as more data becomes available. Annual charges, estimated at \$94,000, are based on the prevailing Federal interest rate of 7 7/8% and a project life expectancy of 50 years. The \$94,000 annual charge includes \$17,000 for annual maintenance.

PROJECT BENEFITS

19. Construction of the previously-described channel enlargement plan would provide \$117,000 in average annual inundation reduction benefits. This plan would provide a safer living area for over 300 families. Additional unquantified benefits would be realized from reduced road and bridge damage, lower emergency costs, and reduced damage to public utilities.

20. Damages and benefits have been analyzed only to the extent necessary to show a need to make more detailed evaluations of the problem area. In the expanded reconnaissance, all pertinent damage and benefit categories will be analyzed. Other viable alternatives will also be analyzed and compared to identify the plan that best meets the planning objectives.

BENEFIT/COST COMPARISON

21. The following tabulation illustrates the benefit/cost comparison of the channel enlargement. Benefits are only for those categories quantified and do not reflect any affluence values.

TABLE 3
BENEFIT-COST COMPARISON

Inundation Reduction Benefits	\$117,000
Annual Project Costs	\$ 94,000
Benefit-to-Cost Ratio	1.2 to 1

FEDERAL RESPONSIBILITIES

22. Project construction cost for flood control measures implemented through Section 205 of the 1948 Flood Control Act, as amended, are apportioned in accordance with traditional cost allocation procedures. In summary, the Federal government should bear the cost of project construction, excluding all costs allocated to bridge or utility modifications and to the acquisition of project-related lands. In addition, the Federal government would bear the cost of preliminary feasibility investigations and under existing regulations the detail design documents. Under the Administrations proposed cost sharing policy, however, the local sponsor would be required to pay 50% of the detail design studies and a minimum of 35% of construction costs.

NON-FEDERAL RESPONSIBILITIES

23. Section 205 projects are local participation projects and require non-Federal participation for acquisition of project-related lands and for cost allocated to bridge and utility modifications. The following items of local cooperation would be required for implementation of a flood control project on Crooked Creek, Bennettsville, South Carolina. Local project sponsors would be required to:

- a. Provide without cost to the United States all lands, easements, and rights-of-way, including disposal areas as determined by the Chief of Engineers, necessary for project construction;
- b. Accomplish without cost to the United States all alterations and relocation of buildings, transportation facilities, storm drains, utilities, and other structures made necessary by project construction;
- c. Hold and save the United States free from damages due to construction, operations, and maintenance of the project, provided damages are not due to the fault or negligence of the United States or its contractors;
- d. Maintain and operate the works after completion in accordance with regulations prescribed by the Secretary of Army;
- e. Prescribe and enforce regulations to prevent obstructions or encroachments on the channels or other flood control works which would reduce

their flood-carrying capacity or hinder maintenance and operation, and control development in the project areas to prevent unwise development; and

f. Periodically inform residents of affected areas that channel improvement will not provide complete flood protection.

g. Pay that part of cost allocated to the Federal Government which exceeds the statutory limitations for Federal participation currently established at \$4,000,000.

WORK PROGRAM

24. Work items considered necessary in preparing an expanded reconnaissance report on flood problems in Crooked Creek are summarized below. The refined studies expected in the Detailed Project Study will also be discussed in this summary. A PB-6 which gives a breakdown of cost for the three stages of study preparation is attached as Inclosure 4.

a. Public Coordination. During the expanded reconnaissance close coordination between planning elements, local governmental representatives and local residents will be maintained. Identification of a local sponsor for the DPS and an indication of willingness and ability to contribute 50% of the cost of that phase will also be accomplished in this study stage. A late stage plan formulation meeting will be held to obtain local views on alternative plans of improvement before selection of a recommended plan and finalization of the DPS.

b. Environmental Studies. A detailed inventory of the environmental resources present along the flood plain and project impact areas will be prepared. This information will be used to determine what the impacts of various alternatives will be on the environment of the study area and to evaluate ways to enhance the environment and/or ameliorate the adverse effects that potential alternatives could have. Finalization and report write-up will be prepared in the DPS.

A cultural resources reconnaissance will be made of the study area with primary emphasis along the immediate project impact area. This will serve to identify either known or possible archaeological and historical sites within the study area. The study will be done in the expanded reconnaissance report.

c. Fish and Wildlife Studies. In accordance with the agreement between the Corps of Engineers and the United States Fish and Wildlife Service, Department of the Interior (USFWS), the Fish and Wildlife Service will conduct appropriate studies to furnish the required Coordination Act Report.

d. Hydrology and Hydraulic Studies. Hydrology and hydraulic studies will be conducted in sufficient detail in the expanded reconnaissance report to identify flood prone areas and delineate the flood plain. Flood profiles for existing conditions and for various plans of improvement will be developed for the appropriate recurrence interval events and the SPF utilizing computed flows and the HEC 2 backwater computer program. Design

details for the selected plan will be completed in the Detailed Project Study at which time the H & H appendix will be finalized.

e. Economic Studies.

Flood Damages:

Studies will be conducted to quantify the average annual flood damages along Crooked Creek by major categories. The categories which will be analyzed are residential property, commercial and public establishments, road and bridge, emergency costs, agricultural, public utilities, and existing dams.

Engineering surveys will be conducted to determine the first-floor elevation of approximately 300 structures located in the flood plain. Field interviews and questionnaires will be used to determine historical and potential flood damages for each of the categories listed above. Real estate studies will be conducted to determine the value of damageable property.

Economic studies of existing and future conditions will be made. It will be necessary to analyze future conditions, both without project and with project, with Lake Wallace Dam in its existing state, and also, assuming that it will be renovated to reflect a safe status. Any reasonable alternative for correcting the flood problem will be analyzed and displayed in order to determine the most desirable plan of action. This will include both nonstructural and structural alternatives.

f. Project Management. The Project Manager will be responsible for overseeing the overall study process and coordinating the efforts of the various study disciplines.

g. Design and Cost Estimates. During the expanded reconnaissance studies design and cost estimates for all alternative plans will be made in sufficient detail to enable the formulation of a best plan of action. In the DPS additional design efforts and refined cost estimates will be made for the selected plan.

h. Surveys. For the expanded reconnaissance study cross sectional surveys will be obtained at each bridge crossing, 50 feet upstream and downstream of each bridge crossing, and every 400 feet between bridges.

i. Foundation and Material Investigations. Jet probings and disturbed (spiltspoon and auger borings) sampling would be conducted during the expanded reconnaissance phase of study. This information would be used to determine material types to be excavated, and the location of disposal sites.

j. Real Estate Studies. The expanded reconnaissance study will require estimates of the value of property located in the flood prone area. Land rights costs in potential construction areas will also be required.

k. Project Formulation. Plan formulation in the expanded reconnaissance study will include working with study team members to formulate a reasonable array of viable alternatives and evaluating the impact of these alternatives in order to select the NED plan of improvement. In the DPS stage, this array will be refined and possibly added to in order to develop the best plan possible to meet Federal and local objectives.

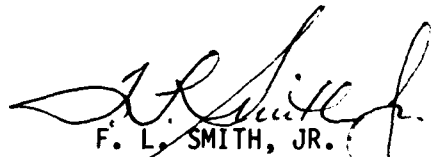
l. Preparation of Report. The expanded reconnaissance report will be in sufficient detail to lead the reader to an understanding of the various alternatives screened and to show justification for processing detailed studies. The DPS report will cover the complete decision process and will contain necessary appendixes to explain in detail the results of the various elements.

CONCLUSIONS

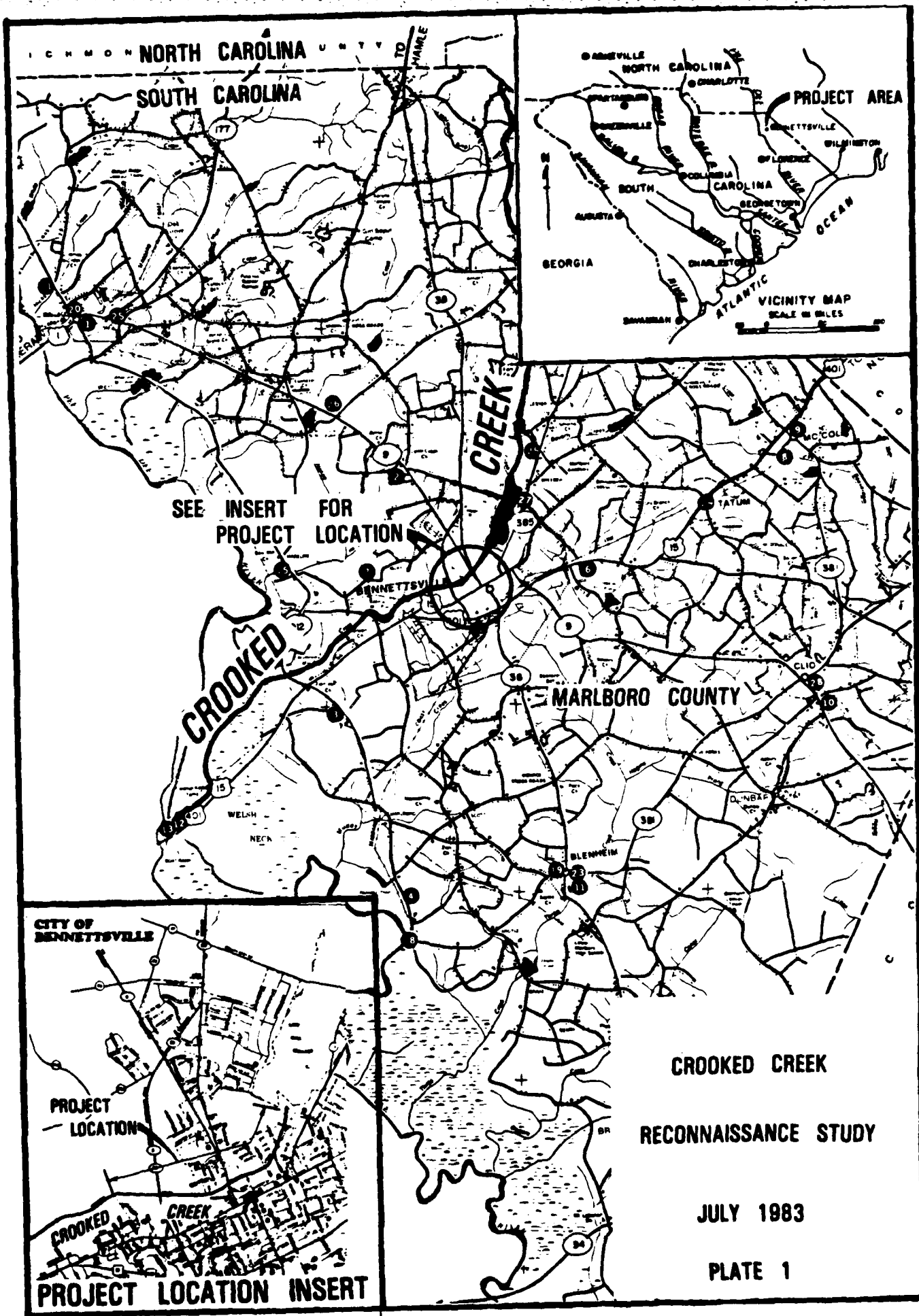
25. The flood problems identified and potential alternatives to these problems are within the scope of the Section 205 program. The estimated costs for completing detailed investigations of the flood prone area are \$193,000 for the expanded reconnaissance report and \$77,000 for the Detailed Project Study. Should a reservoir be included in the NED plan, \$204,000 would be required for the Detailed Project Study (See Inclosure 5). It will take 6 to 8 months to complete the expanded reconnaissance work.

RECOMMENDATIONS

26. Based upon information presented in this report, it is recommended that further study of flood problems in Crooked Creek be authorized. Estimated study cost for completion of an expanded reconnaissance report is \$193,000. It is recommended that funds in this amount be allocated to Charleston District as soon as practical in order that the subject study may be pursued. Costs for preparation of this reconnaissance report were approximately \$7,500. Request for reimbursement of these funds will be made by separate correspondence after final approval of this report.


F. L. SMITH, JR.
LTC, Corps of Engineers
Commanding

5 Incl.
as





City of Bennettsville
EXECUTIVE DEPARTMENT
Bennettsville, South Carolina 29512

May 16, 1983

LTC. B. E. Stalmann
District Engineer
U. S. Army Engineer District, Charleston
P. O. Box 191
Charleston, S. C. 29402

Re: Flood Control Project

Dear Col. Stalmann:

The citizens of our community have approached the City Council requesting assistance with a flood control project in and around the area of Crooked Creek here in the City of Bennettsville. On behalf of our citizens, the City Council respectfully request that the Corps of Engineers undertake a study under Section 205 of the 1948 Flood Control Act as amended to determine the extent of our problem and what solutions may best solve the dilemma in the long run.

The specific problem in Bennettsville deals with the immediate surrounding area of what is known as Crooked Creek. This body of water runs from the dam at the end of Lake Wallace in the City down to the McColls Mill Pond just slightly outside the City. All throughout this area the creek runs through residential areas. During the recent heavy rains of March of this year, uncontrolled flooding occurred in the residential areas by the creek. This is simply one of many instances over the past years where this has occurred. A copy of the map showing the location of Crooked Creek is enclosed with this letter.

The City of Bennettsville is prepared to provide all the local cooperation necessary to affect this project. We would greatly appreciate and look forward to the assistance of the Corps of Engineers. Should you have any further questions, please contact us.

Sincerely,

John J. Weaver, III
John J. Weaver, III
Mayor

JJW, III/pjc

Enc.

SOUTH CAROLINA'S FIRST "GREAT" TOWN
"Governor's Rural Economic Achievement Trophy"

10211

1 July 1983

MEMORANDUM FOR RECORD

SUBJECT: Preliminary Environmental Assessment of Crooked Creek,
Bennettsville, South Carolina, Flood Problems

1. A field reconnaissance of areas with flood problems in the Town of Bennettsville, South Carolina, was conducted on 27 and 28 June 1983. Representatives of the Charleston District, U. S. Army Corps of Engineers, and the Charleston Field Office, U. S. Fish and Wildlife Service, surveyed the area in the vicinity of Crooked Creek to gather preliminary background data and to develop initial concepts for flood protection.
2. Flooding is caused by overflow of water from Crooked Creek which generally flows west through the north central portion of Bennettsville. The Creek carries discharges from Lake Wallace, a 442 surface acre lake, which receives drainage from 56.8 square miles of land.
3. Crooked Creek, below Lake Wallace, was channelized at an undetermined time in the past. This may have occurred at the time Lake Wallace Dam was constructed. The banks of the stream are almost vertical for about two miles downstream of the dam. A sewer line and dirt road parallel the south side of the creek. Large trees grow up to the edge of the bank on the north side and several areas of heavy tree growth occur adjacent to the sewer line along remnants of the original, natural channel. The stream appears to have an irregular sand bottom with numerous snags and sewerline crossings. Alligator weed (Alternanthera philoxeroides) is well established in several areas along the creek and probably restricts flows.
4. No archaeological, historical, or historical-architectural resources were identified during this reconnaissance. A literature search and reconnaissance by a professional archaeologist will be necessary if a study is approved. The estimated cost of this work is \$3,000.
5. If, as a result of this reconnaissance, further study is determined to be feasible, additional ecological analyses, particularly in the wetlands associated with the old stream channel, and investigation of the effects of alternatives will be necessary. These studies as well as the preparation of necessary environmental documents for the DPR would require approximately 45 workdays (\$13,000).

JOSEPH E. PAXTON
Environmental
Environmental Resources Branch

Incc 2



United States Department of the Interior
FISH AND WILDLIFE SERVICE
P.O. BOX 12559
217 FORT JOHNSON ROAD
CHARLESTON, SOUTH CAROLINA 29412

*cy printed in
EN-E*

July 19, 1983

Lt. Colonel F. Lee Smith, Jr.
District Engineer
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, South Carolina 29402

Re: Crooked Creek Reconnaissance Study, Bennettsville, S.C.

Dear Colonel Smith:

This letter is provided in response to the reconnaissance study being conducted by the Charleston District Corps of Engineers on Crooked Creek in Bennettsville, S.C. These comments are provided on a planning-aid basis and partially fulfill our responsibilities under the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

A representative from this office participated in a field trip with the Project Manager and other members of the study team on June 27, 1983. The problem under study is the flooding of residential properties located within the Crooked Creek floodplain just downstream from the Lake Wallace dam.

On the basis of the areas that were observed during the inspection there are fish and wildlife resources that need to be given special consideration if it is determined that a project is needed and a study is initiated.

The segment of the tentatively proposed study area that we predict has the highest fish and wildlife value extends from Lindsey Avenue to the sewage treatment plant at the lower end of the previously channelized section of Crooked Creek.

In order for the FWS to adequately assess the value of the resources present, evaluate the potential impacts of a proposed project and provide you with a FWCA report, we will need the amount of transfer funds shown below.

	<u>Biologist Days</u>
Literature review	2
Habitat mapping and analysis	2
Field surveys	2
Fish and wildlife resource use	3
Interagency coordination	2
Evaluation of alternatives	2
Impact assessment	2
Planning-aid report	4
Draft and final FWCA report	6
	<hr/>
Total Biologist Days	25
Cost at \$200/bd	\$5,000
38% Service Overhead	<u>\$1,900</u>
TOTAL	\$6,900

To assist you in your evaluation of this reconnaissance study we wish to point out certain project features that we will probably recommend as our input to your planning process as authorized by the FWCA.

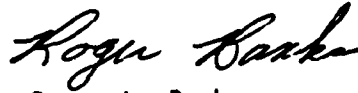
- a. Maintenance and/or enhancement of waterflow into and through the forested wetlands adjacent to Crooked Creek:

Based on our initial evaluation of the area it appears that high water flows could be diverted from Crooked Creek (both sides) in an attempt to restore the natural hydrologic regimes in these forested habitats. We believe this could be done without detracting from the objectives of the flood control project. In fact, your studies might show that such a concept would facilitate the reduction of flood flows in the upper reaches of the project area.

- b. Design of certain project features that maximize the fishery habitat values of Crooked Creek if channel alterations are implemented.

We appreciate the opportunity to assist you in this reconnaissance study and look forward to participating in your planning process if a study is implemented.

Sincerely yours,

A handwritten signature in cursive script that reads "Roger Banks".

Roger L. Banks
Field Supervisor

RLB/lm

STUDY COST ESTIMATE (PB-1) (5000)		APPROPRIATION TITLE:		NAME OF STUDY			
CATEGORY		General Investigations		Crooked Creek, Bennettsville, SC			
CLASS		FLOOD CONTROL		Marlboro County, SC			
SUBACCOUNT		Local Protection		SUBCLASS Section 205			
LINE NO.	NUMBER	TITLE	CURRENT FEDERAL COST ESTIMATE			PREVIOUS FEDERAL COST ESTIMATE AND DATE APPROVED	REMARKS
			RECON	EXPANDER RECON	D.P.S.		
			a	b	c	d	e
1		Public Coordination	0.5	7.0	7.0	14.5	
2		Environmental Studies	1.0	10.0	3.0	14.0	
3		F & W Services	0.	7.0	-	7.0	
4		H & H Studies	1.0	50.0	13.0	64.0	
5		Economic Studies	1.0	42.0	10.0	53.0	
6		Project Management	0.5	12.0	7.0	19.5	
7		Design & Cost Estimates	0.5	5.0	2.0	7.5	
8		Surveys	-	15.0	3.0	18.0	
9		Foundation and Material	1.0	9.0	7.0	17.0	
10		Real Estate	-	4.0	1.0	5.0	
11		Project Formulation	0.5	4.0	2.0	6.5	
12		Preparation of Report	1.0	10.0	15.0	26.0	
13		Contingencies	0.5	18.0	7.0	25.5	
14		TOTAL	7.5	193.0	77.0	277.5	
DATE PREPARED		DIVISION		REGION		Page 1 of 2	
		SOUTH ATLANTIC CHARLESTON		SOUTH ATLANTIC - GULF			
		DISTRICT		BASIN			

STUDY COST ESTIMATE (PB-6) (6000) For use of this form, see BR 11-2-229		APPROPRIATION TITLE: General Investigations			NAME OF STUDY Crooked Creek, Bennettsville, SC Marlboro County, SC		
CATEGORY FLOOD CONTROL		CLASS Local Protection			SUBCLASS Section 205		
LINE NO.	SUBACCOUNT	TITLE	CURRENT FEDERAL COST ESTIMATE			PREVIOUS FEDERAL COST ESTIMATE AND DATE APPROVED ()	REMARKS
			RECON	EXPANDED RECON	D.P.S.		
			c	d	e	f	g
1		Public Coordination	0.5	7.0	8.0	15.5	
2		Environmental Studies	1.0	10.0	13.0	24.0	
3		F & W Services	-	7.0	3.0	10.0	
4		H & H Studies	1.0	50.0	21.0	72.0	
5		Economic Studies	1.0	42.0	10.0	53.0	
6		Project Management	0.5	12.0	10.0	22.5	
7		Design & Cost Estimates	0.5	5.0	8.0	13.5	
8		Surveys	-	15.0	8.0	23.0	
9		Foundation and Material	1.0	9.0	81.0	91.0	
10		Real Estate	-	4.0	4.0	8.0	
11		Project Formulation	0.5	4.0	4.0	8.5	
12		Preparation of Report	1.0	10.0	16.0	27.0	
13		Contingencies	0.5	18.0	18.0	36.5	
14		TOTAL	7.5	193.0	204.0	404.5	
DATE PREPARED		DIVISION SOUTH ATLANTIC CHARLESTON		REGION SOUTH ATLANTIC - GULF		Page 2 of 2	

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